

AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior versions of the claims.

1 – 54. (Cancelled)

55. (Currently amended) A microfluidic system comprising: ~~a substrate, wherein the substrate comprises a single microfluidic structure having~~

a) ~~at least one measurement chamber for containing one or more cells or lipid based cell structures, wherein the measurement chamber comprising~~ comprises ~~walls surrounding and a base; and~~

b) ~~at least one hollow nanotip protruding from the walls or base of the measurement chamber and having an aperture at an end of the nanotip; and tip, the tip comprising a housing defining a lumen and an aperture for detecting an electrical property of one or more cells or lipid based cell structures, wherein the tip is raised from the substrate of the walls or base of the chamber, and further wherein at least one tip is inserted into a cell or lipid based cell structure, and wherein the substrate further comprises~~

c) ~~at least one microchannel in communication with the measurement chamber, the microchannel having with at least one inlet positioned to receive for receiving an aqueous solution and at least one outlet, wherein the outlet opens into the at least one measurement chamber, and wherein the outlet delivers~~ positioned to deliver the aqueous solution into the measurement chamber.

56. (Currently amended) The microfluidic system ~~of according to~~ claim 55, wherein at least one of the ~~at least one~~ measurement chambers is circular ~~and a plurality of microchannels are radially disposed about the chamber and comprise outlets that open into the chamber.~~

57. (Currently amended) The microfluidic system ~~of according to~~ claim 55, wherein the nanotip lumen comprises a conducting medium.

58. (Currently amended) The microfluidic system ~~of according to~~ claim 57, wherein the conducting medium is a liquid conducting medium.

59. (Currently amended) The microfluidic system ~~of according to~~ claim 58, wherein the liquid conducting medium comprises an electrolyte solution, or an electrically conducting polymer.

60. (Currently Amended) A microfluidic system comprising a ~~substrate, wherein the substrate comprises a single microfluidic structure having~~

a) ~~at least one measurement chamber for containing one or more cells or lipid-based cell structures, the measurement chamber comprising walls surrounding and~~ a base;

b) ~~and a plurality of solid electrode tips for detecting an electrical property of one or more cells or lipid-based cell structures, wherein the electrode tips protrude from the walls or base of the measurement chamber; and tip is raised from the substrate of the walls or base of the chamber and the tips comprise a housing defining a lumen, where the housing comprises a solid state conducting material, wherein at least one tip is inserted into a cell or lipid based cell structure, and wherein the substrate further comprises~~

c) ~~at least one microchannel in communication with the measurement chamber, wherein the microchannel comprises with~~ at least one inlet ~~position to receive for receiving~~ an aqueous solution and at least one outlet ~~positioned to, wherein the outlet opens into the at least one measurement chamber, and wherein the outlet delivers deliver~~ the aqueous solution into the measurement chamber.

61. (Currently amended) The system ~~of according to~~ claim 55 or 60, wherein the at least one tip is tapered to facilitate insertion into a cell or cell structure.

62. (Currently amended) The system ~~of according to~~ claim 55 or 60, wherein at least one tip comprises a contacting surface for contacting biological molecules or macromolecules and wherein the contacting surface comprises a hydrophilic material.

63. (Cancelled)

64. (Currently amended) The system of ~~according to~~ claim 62, wherein at least one contacting surface comprises a diameter of less than about 5 μm .

65. (Currently amended) The system of ~~according to~~ claim 62, wherein at least one contacting surface comprises a diameter of less than about 1 μm .

66. (Cancelled)

67. (Currently amended) The system of ~~according to~~ claim 55 or 60, further comprising a pressure control device for controlling positive and negative pressure applied to at least one microchannel.

68 – 70. (Cancelled)

71. (Currently amended) The system of ~~according to~~ claim 55 or 60, wherein the system ~~substrate~~ is interfaced to a multiwell plate through one or more external tubings or capillaries.

72 – 82. (Cancelled)

83. (Currently amended) The system of ~~according to~~ claim 55 or 60, further comprising an amplifier in communication with the at least one electrode.

84 – 88. (Cancelled)

89. (Currently amended) The system of ~~according to~~ claim 55 or 60, further comprising a plurality of buffer delivery and agonist delivery channels, each channel comprising an outlet for delivering a substantially separate aqueous stream into the chamber.

90. (Cancelled)

91. (Currently amended) The system ~~of according to~~ claim 55 or 60, wherein at least one microchannel delivers at least one agent into the measurement chamber.

92 – 103. (Cancelled)

104. (Currently amended) The ~~method~~ system of claim 55, wherein the at least one tip protrudes extends from a substantially planar portion of the measurement chamber.

105. (Currently amended) The ~~method~~ system of claim 60, wherein the plurality of ~~solid electrode~~ tips ~~extends~~ protrude from a substantially planar portion of the measurement chamber.

106. (Cancelled)